

WHAT IS CLAIMED IS:

- ~~SUB 2~~ 1. An endoscopic imaging system comprising:
- ~~an endoscope having an illumination optical system for illuminating an object and an objective optical system for introducing an optical image of the illuminated object incorporated in an elongated insertion unit thereof;~~
  - ~~an imaging apparatus having an imaging device for picking up the optical image;~~
  - ~~a video processing unit to which said imaging apparatus is connected so that it can be disconnected freely and which processes a signal to produce a standard video signal;~~
  - ~~a display means for displaying images of said object according to an input standard video signal;~~
  - ~~a timing signal generation circuit, incorporated in said imaging apparatus, for generating timing signals used to drive said imaging device; and~~
  - ~~a phase adjustment circuit for adjusting the phases of the timing signals so as to compensate a signal delay occurring over a signal transmission line to said imaging device which is linked and over which a signal is transmitted.~~
2. An endoscopic imaging system according to claim 1, wherein said phase adjustment circuit adjusts the phases of

the timing signals so that an output signal of said imaging device to be input to said video processing unit will be in phase with a predetermined timing signal produced in said video processing unit.

3. An endoscopic imaging system according to claim 1, wherein said video processing unit has a sync signal generation circuit for outputting sync signals to said timing signal generation circuit.

4. An endoscopic imaging system according to claim 1, wherein said imaging apparatus has a sampling circuit for sampling an output signal of said imaging device according to timing signals generated by said timing signal generation circuit.

5. An endoscopic imaging system according to claim 1, wherein said imaging apparatus has an analog-to-digital conversion circuit for digitizing an analog output signal of said imaging apparatus according to a timing signal generated by said timing signal generation circuit.

6. An endoscopic imaging system according to claim 1, wherein said video processing unit has an analog-to-digital conversion circuit for digitizing an analog output signal of

said imaging device according to a timing signal generated by said timing signal generation circuit.

7. An endoscopic imaging system according to claim 1, wherein said imaging apparatus has checking terminals used to check phase differences between the timing signals generated by said timing signal generation circuit and an output signal of said imaging device having passed through said signal transmission line.

8. An endoscopic imaging system according to claim 1, wherein said video processing unit has checking terminals used to check phase differences between the timing signals generated by said timing signal generation circuit and an output signal of said imaging device having passed through said signal transmission line.

9. An endoscopic imaging system according to claim 1, wherein said phase adjustment circuit adjusts the phases of the timing signals according to a regulated resistance to be produced by a variable resistor.

10. An endoscopic imaging system according to claim 1, wherein said phase adjustment circuit adjusts the phases of the timing signals according to a regulated output voltage

of an electronic voltage regulator.

11. An endoscopic imaging system according to claim 10, wherein said video processing unit has an electronic voltage regulator voltage setter for setting an output voltage of said electronic voltage regulator.

SUB 96 12. An endoscopic imaging system according to claim 1, wherein said phase adjustment circuit selects successive delay elements from among a plurality of delay elements connected in tandem so as to adjust the phases of the timing signals.

13. An endoscopic imaging system according to claim 1, wherein said phase adjustment circuit employs a delay device for producing a delay, of which magnitude is varied depending on an applied voltage, so as to adjust the phases of the timing signals.

14. An endoscopic imaging system according to claim 1, wherein said endoscope is an optical endoscope having a propagation optical system for propagating the optical image, and said imaging apparatus is a TV camera mounted on said optical endoscope and having said imaging device, which picks up the optical image propagated by said propagation

optical system, incorporated therein.

15. An endoscopic imaging system according to claim 1, wherein said endoscope is an electronic endoscope having said imaging device located at the position of the image plane of said objective optical system, and said electronic endoscope has said imaging apparatus incorporated therein.

16. An endoscopic imaging system according to claim 1, wherein said phase adjustment circuit adjusts the phases of the timing signals, that is, a horizontal driving signal used to horizontally drive said imaging device and a reset signal used to reset said imaging device so that said imaging device will output a signal according to the timing of signal processing performed by said video processing unit.

17. An endoscopic imaging system according to claim 1, wherein said timing signal generation circuit and said phase adjustment circuit are interposed between one end of said signal transmission line which is linked to said imaging device, and the other end thereof which is linked to said video processing unit.

SUB A7

18. An endoscopic imaging system comprising:  
an optical endoscope having an illumination optical

system for illuminating an object, an objective optical system for introducing an optical image of the illuminated object, and a propagation optical system for propagating the optical image incorporated in an elongated insertion unit thereof;

an imaging apparatus mounted on said optical endoscope and having an imaging device for picking up the optical image of the object propagated by said propagation optical system;

a video processing unit to which said imaging apparatus is connected so that it can be disconnected freely and which processes a signal to produce a standard video signal;

a timing signal generation circuit, incorporated in said imaging apparatus, for generating timing signals used to drive said imaging device; and

a phase adjustment circuit for adjusting the phases of the timing signals so as to compensate a signal delay occurring over a signal transmission line to which said imaging device is linked and over which a signal is transmitted.

19. An endoscopic imaging system according to claim 18, wherein said imaging apparatus has a TV camera head with a built-in imaging device, a cable extended from said TV camera head and containing said signal transmission line

linked to said imaging device, and a connector unit attached to the end of said cable and coupled to said video processing unit so that it can be uncoupled freely.

20. An endoscopic imaging system according to claim 19, wherein said connector unit has said timing signal generation circuit and said phase adjustment circuit.

21. An endoscopic imaging system according to claim 19, wherein said camera head has said timing signal generation circuit and said phase adjustment circuit.

SUBA2 22. An endoscopic imaging system comprising:  
an electronic endoscope having an illumination optical system for illuminating an object, an objective optical system for introducing an optical image of the illuminated object, and an imaging device located at the position of the image plane of said objective optical system for picking up an image incorporated in an elongated insertion unit thereof;

a video processing unit to which said electronic endoscope is connected so that it can be disconnected freely and which processes a signal to produce a standard video signal;

a display means for displaying images of said object

according to an input standard video signal;

a timing signal generation circuit, incorporated in said electronic endoscope, for generating timing signals used to drive said imaging device; and

a phase adjustment circuit for adjusting the phases of the timing signals so as to compensate a signal delay occurring over a signal transmission line to which said imaging device is linked and over which a signal is transmitted.

23. An endoscopic imaging system according to claim 22, wherein said electronic endoscope has an operation unit, which is held by an operator, formed at the rear end of said insertion unit, and has said timing signal generation circuit and said phase adjustment circuit incorporated in said operation unit.

SUBA9 24. An endoscopic imaging system according to claim 22, wherein said electronic endoscope has a light source connector unit which is coupled to a light source apparatus for generating illumination light so that it can be uncoupled freely, and has said timing signal generation circuit and said phase adjustment circuit incorporated in said light source connector unit.



25. An endoscopic imaging system according to claim 22, wherein said electronic endoscope has a signal connector unit which is coupled to said video processing unit so that it can be uncoupled freely, and has said timing signal generation circuit and said phase adjustment circuit incorporated in said signal connector unit.

26. An endoscope system comprising:

first and second endoscopes each having an illumination optical system for illuminating an object and an objective optical system for introducing an optical image of the illuminated object incorporated in insertion units thereof;

first and second imaging apparatuses having first and second imaging devices for picking up optical images produced by said first and second endoscopes;

a video processing unit to which said first and second imaging apparatuses are connected so that they can be disconnected freely and which processes a signal to produce a standard video signal;

a display means for displaying images of the object according to an input standard video signal;

first and second timing signal generation circuits, incorporated in said first and second imaging apparatuses, for generating timing signals used to drive said imaging devices; and

first and second phase adjustment circuits for adjusting the phases of the timing signals so as to compensate a signal delay occurring over first and second signal transmission lines to which said first and second imaging devices are linked and over which a signal is transmitted.

27. An endoscope system according to claim 26, wherein said first and second imaging apparatuses have said first and second signal transmission lines of mutually different lengths extended therefrom.

28. An endoscopic imaging system according to claim 26, wherein said first and second imaging apparatuses have said first and second imaging devices that offer mutually different numbers of pixels.

29. An endoscopic imaging system according to claim 26, wherein said first and second imaging apparatuses have said first and second timing signal generation circuits and said first and second phase adjustment circuits located at mutually different positions on said first and second signal transmission lines linking said first and second imaging devices and said video processing unit.